THE

Microzine®

Guide to

Critical Thinking

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SCHOLASTIC

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INTRODUCTION

What's New About Critical Thinking?

For years, classroom teachers have been teaching their students the skills of critical thinking. In fact, critical thinking, sometimes referred to as higher-order thinking or reasoning, has long been an *integral part of the traditional curriculum*. To cite but a few examples, **observing**, **comparing**, **contrasting**, **sequencing**, **analyzing**, **estimating**, **inferring**, and **predicting** are critical-thinking skills commonly developed as part of the general language arts, mathematics, science, and social studies curricula. In this respect, critical thinking is not new for educators.

What *is* new is the emphasis on providing more and broader opportunities for students to apply the skills of critical thinking. Recent government reports and professional research and literature have stressed that: "...students (need to) develop the capacity to use the knowledge and skills they acquire in school for thoughtful or innovative purposes." (Applebee, Langer, and Mullis, 1989) And that: "The most important thing that can be said to teachers at this time is to ensure that each child learns what the thinking roles are, that he or she has ample practice in using them, and some supervised opportunities to apply them to new situations." (Hudgins and Edleman, 1988) Researchers have also recommended that critical thinking should be taught across the curriculum, emphasizing that: "Students should be taught to think logically, to analyze and compare, to question and evaluate in every course, especially content subjects." (Carr, 1988)

The Microzine Guide to Critical Thinking offers practical information on how to work within your *existing curriculum* to increase student skill in critical thinking. It also shows how to use Microzine® and Microzine Jr.

software to broaden student experience and skill in critical thinking by providing activities and management strategies to help you implement a plan that will work for you and your students. The sample activities include the use of programs found in Issues 1–5 of Microzine Jr. and Issues 22–31 of Microzine. However, Issues 1–21 of Microzine also can be used as well as all future issues of Microzine and Microzine Jr. A curriculum index to the series, including Issues 1–21, is available in the *Educator's Guide to Microzine and Microzine Jr.* Information on ordering the guide is on page 38 of the "Appendix."

Why Has Critical Thinking Become So Important?

There are several reasons for the increased interest in critical thinking. One is a growing awareness that students who have learned how to think critically are more likely to achieve. They more easily can develop strategies for coping with new information and situations; they are more engaged in the learning process; and they feel more confident about their ability to succeed in school, and so they do succeed more often.

An equally compelling reason to foster critical thinking is found in the long term objective of education—to prepare the adult citizens and work force of tomorrow. To accomplish this, we must train students as lifelong learners, for they will face a world in which the rate of change and need to learn new concepts and skills will increase exponentially over the course of their lives. The content knowledge we teach today will be affected quickly by the events and technology of tomorrow. For this reason it is now as important—perhaps more important—to teach students *how* to learn as it is to teach them *what* to learn.

The skills of critical thinking are the very stuff of learning. They enable students to make informed decisions, to understand and apply concepts, to make reasoned judgments, and to define problems and create and implement strategies for solving them. All students need these abilities, and all students can develop them. However, there is neither enough time in the day, nor the need to develop a critical-thinking curriculum *per se*. What is needed is a means by which critical-thinking skills can be emphasized in the context of the existing curriculum. This is what Microzine is designed to do.

How Does Microzine Develop Skill in Critical Thinking?

The power of Microzine is that it is a software series students love to use and that it weaves imaginative and motivating critical-thinking activities into curriculum contexts. Every issue of Microzine Jr. (grades 1–4) and Microzine (grades 4–8) includes four full-length programs, each of which is built around the skills of the traditional curriculum.

These programs include interactive reading adventures that engage students in analytical activities such as sequencing, looking for clues, and making inferences and predictions; classroom and desktop publishing programs that provide motivating and rewarding opportunities for critical thinking and writing; and imaginative mathematics word problems that can be solved using alternative problem-solving strategies. Some programs include content area reading in science and social studies, and others enable students to practice such important curriculum skills as writing, mapping, charting, graphing, estimating, and working with computation and percents.

Many of the Microzine and Microzine Jr. activities have goals derived from real life, such as efficiently running the stores in *Math Ani-Mall* and *Math Mall* or creating graphs and charts with *Graph Maker*. Furthermore, the programs are made for flexible use. They can be used in teacher-directed lessons, as cooperative learning activities, or as activities for individual students. Because the length of program activities ranges from short brainteasers, such as *Eye Spy* and *Monitor Mysteries,* to longer *Twistaplot*™ reading adventures, teach-

ers can fit the programs into a variety of situations and time slots.

Microzine and Microzine Jr. programs include clear on-screen instructions for their use. Each issue also includes a *Student Handbook and Teacher's Guide* for additional tips and suggested school and home activities, to extend and enrich the students' learning experiences. *The Microzine Guide to Critical Thinking* focuses on further structuring the use of Microzine around the application of critical thinking in the content areas.

The next two chapters, "Introducing Critical Thinking to Students" and "Getting the Most Out of Microzine," provide practical information on how to implement Microzine or Microzine Jr. activities in your classroom. The activities and mangagement strategies, when used in conjunction with the software, will help you to:

- integrate critical thinking with the general curriculum so that your students can become more able learners;
- develop your students' awareness of the critical-thinking process through teacher-directed and group discussions;
- provide your students with a variety of opportunities in which to apply and practice their skills as critical thinkers; and
- create cooperative learning environments in which subjects can be explored and problems solved through teamwork.

INTRODUCING STUDENTS TO CRITICAL THINKING

Activities for Building Critical-Thinking Vocabulary

Try to introduce critical thinking at the beginning of the school year. By doing so, from the start you can infuse your curriculum lessons with the language and skills of critical thinking. A primary goal is to increase your students' awareness of critical thinking as an important and integral tool of learning—*in all subject areas!* By providing them with opportunities in which to explore and articulate critical-thinking concepts, your students will become more able learners who can *reflect on what they are studying and on the thinking strategies they employ when inquiring about the world around them, solving problems, and making decisions.*

To begin the process, students need to learn the "language" of critical thinking. There are a variety of ways in which to introduce this vocabulary. One way is to start from your students' own experiences in order to help them examine and monitor their behavior and build on their prior knowledge. This approach to thinking is similar in philosophy to Whole Language, which emphasizes the development of written and oral language in "learning how to learn" and the importance of student-centered activities.

A sample lesson that suggests how you might introduce students to the concepts and vocabulary of critical thinking in the context of problem solving is provided here. You can adjust the language and complexity of the lesson to the age and ability level of the students in your class.

Begin the lesson by asking: *"What events or situations did you think about today that are especially important*

to you?" You can prompt your students by asking them to complete the thought: *"One thing that bothered me today was... ." List the students' issues on the chalkboard.*

1. *Jean's birthday party*
2. *Wednesday's social studies test*
3. *Maria's argument with her friend*
4. *Friday's baseball game*
5. *Leroy's sick dog*
6. *Ilan's trip to Arizona*

Next, explore *how* your students thought about these issues, by asking: *"What are some of the questions you considered when you thought about your birthday; the social studies test... ? For example, did you ask yourself questions about how you could solve your problem or who could assist you? Did you consider by when you needed to make decisions?"* (Using examples like these, help your students realize that, directly or indirectly, they did pose questions to themselves.) List on the board the questions for several of the issues:

Birthday Party

1. *Who should I invite to my party?*
2. *How many friends will my parents allow?*
3. *On which day should I have the party?*

Social Studies Test

1. *How will I pass the test?*
2. *Who can help me prepare for the test?*
3. *When will I have time to study?*

Argument with Friend

1. *Why did my friend behave as she did?*
2. *Should I call to ask her?*
3. *What should I say to her?*

Point out that each issue contains a problem that needs to be solved (e.g., how to plan the party, how to pass the test, etc.). Ask your students to state the underlying problem contained in their issue.

For each of the stated problems, ask: *"Are there additional questions that need to be asked in order to solve the problem?"* Before writing each student's question on the board, ask for his or her **reasons** for thinking the answer to that question will help solve the problem. Based on the student's response, point out which reasons appear to be **logical** and which do not seem to make as much sense.

Continue to brainstorm with your students. Try to

The skills listed below reflect some of the most commonly taught skills of critical thinking. You can refer to this list as you plan activities throughout the year and select vocabulary/skills that you will introduce or reinforce.

Observing	Using Inductive Reasoning
Planning	Using Deductive Reasoning
Organizing	Evaluating
Sequencing	Drawing Conclusions
Classifying	Making Decisions
Comparing	Understanding Cause-and-Effect Relationships
Contrasting	Understanding Point of View
Predicting	Distinguishing Between Fact and Opinion
Inferring	Distinguishing Between Reality and Fantasy
Analyzing	Judging Credibility
Synthesizing	Judging Relevance of Information
Interpreting	Formulating and Expressing Opinions
Hypothesizing	Identifying Part:Whole Relationships
Inquiring	Noting Inconsistencies
Estimating	Detecting Bias
Intuiting	Identifying Propaganda
Generalizing	Recognizing Patterns
Changing Variables	Using Trial and Error
Reflective Thinking	Creative Thinking
Metaphorical Thinking	Developing Problem-Solving Strategies
Identifying and Comparing Advantages and Disadvantages	

elicit as much information and as many ideas as you can from them on how to solve the problems. Depending on the age of your students, you can use more or less sophisticated vocabulary to prompt them. However, it is strongly recommended that you *do* use vocabulary that is as precise and as critical-thinking oriented as possible, here and whenever you engage your students in discussions.

By using precise critical-thinking language (e.g., "What can you **conclude** from Jean's statement?" instead of "What do you think Jean meant?" or "What do you **predict** Roseanne will do?" instead of "What do you think...?"), we give students the labels that identify *specific critical-thinking skills.* When students hear these terms consistently in the context of solving problems, they internalize the meaning and significance of this vocabulary.

As the class continues its discussion, write the critical-thinking vocabulary on the board in the context in which it arises. For example, you may write: *"Rami **predicts** that Roseanne will be willing to speak with Maria on the phone."* Other terms that you may want to encourage your students to use are **infer**, **evaluate**, **plan**, **decide**, and **analyze**.

When you have completed your discussion (15–20 minutes), tell your students: *"You have been doing a lot of '**critical thinking.**'"*(Write the term on the board.) Explain that: *"critical thinking involves many different skills that help us make decisions, define and solve problems, and understand new ideas and information."* Give your students some examples, and elicit others from them, of the many ways in which people use critical-thinking skills to learn and accomplish work. Say: *"Members of a jury **draw conclusions** and **make decisions** based on the information they receive at a trial; police detectives often use **deductive reasoning** to solve mysteries; inventors use **trial and error** to learn how to make better inventions; meteorologists **make predictions** about the climate; and lawyers and judges **interpret** the Constitution of the United States... ."*

Point to the skills you've listed on the board and tell your students: *"The skills of critical thinking help us succeed at almost everything we do. We will continue to use these skills when we read, write, and do mathematics, social studies, and science. We will think critically when we use pencils and when we use computers. And we will do critical thinking even when we play games."*

To conclude the lesson, introduce one of the "brainteasers" from an *Eye Spy* or *Micro Mystery* program in Microzine Jr., or a *Picture This* or *Monitor Mystery* program from Microzine. Information on these programs begins on page 27 of this guide.

As you work with your students now and over the course of the year, keep in mind that the objective of using critical-thinking vocabulary is not to speak more formally *per se*, but rather to heighten student awareness of, and skill in, critical thinking. Through that awareness and the development of skills, your students will be better able to structure their approach to learning.

Initially, you may feel uncomfortable teaching the vocabulary and concepts of critical thinking. You may feel inexperienced and concerned that your knowledge of the concepts may not be complete. Rest assured, as was pointed out earlier in this guide, that you have been teaching the skills of critical thinking for years even though you may not have formally referred to it as that. Furthermore, the truth is that *everyone* sometimes has difficulty identifying which critical-thinking skill is operative or what strategy would be appropriate to a particular inquiry or problem-solving situation. When this happens, experienced teachers find it helpful to brainstorm with one another (or with their students) and, working collaboratively, they are successful!

Management Strategies

Labs versus Classrooms Students can work on Microzine brainteasers individually, in teams of two or three in a computer-lab setting, or in groups of up to five per computer in a classroom. *Eye Spy* and *Picture This* are short programs that generally can be completed in

5 to 15 minutes. If you have only one computer in your room, you can divide your class into teams of four students each, allowing all students to work at the computer during the course of one day. Thus, by the end of the day, when all your students have completed the activity, you can provide the entire class with a concluding discussion.

Monitoring Student Work When students work in teams, monitor their discussions to ensure that all students are participating in the activity. Through prompting, encourage students to use the vocabulary of critical thinking. If students are working individually, it is helpful to ask them questions to reinforce their use of the vocabulary as they apply the thinking skills.

Extension Activities

Sensory Awareness Whether you are working with younger or older students, or whether your classroom is a Whole Language environment or a more traditional one, it can be interesting and useful to help students compare what it physically feels like to answer questions that do *not* require critical thinking with those that *do*. Turn off the lights and have your students sit at their desks with their eyes closed and their heads supported by one hand (with that arm's elbow on the table). Be sure that their hand is covering their forehead, eyebrows, and at least the upper part of their nose. Ask a series of three questions to which you know they will have immediate mental responses, such as: *"What is your favorite color? Do you have any sisters? How old are you?"* (Before asking the questions, tell your students to answer them silently to themselves.) As a fourth question, to engage students in critical thinking, ask an age-appropriate riddle.

After about 20 seconds, turn on the lights and ask your students to **compare** and **contrast** what it felt like when they answered the first three questions as opposed to the fourth. Ask them if their forehead felt "different," or if they tightened it, or if their eyebrows or nose moved; ask them if the inside of their head felt different, if it felt like their minds were doing work; ask

them if they felt strained or frustrated as they tried to answer the fourth question.

Now ask the students to **analyze** the four questions in terms of the thinking skills they required. Guide your students to an understanding of how the first three questions required no skill or effort other than **recalling** information, but the fourth question required the hard work of orchestrating the use of several difficult skills (e.g., **organizing**, **sequencing**, and **interpreting information**; and **making inferences**).

To reinforce the mind-body connection, you can repeat the exercise. This time ask your students to focus on the physical sensations of critical thinking that were discussed. To conclude the exercise, you can point out that: *"Critical thinking is hard work, but doing it with regularity helps build strong 'mental muscles.' We are going to do a lot of critical thinking this year. By the time June comes, you're going to be in great shape!"*

Flash Cards Make flash cards for the vocabulary of critical thinking, such as "infer" and "compare," creating additional cards as you add vocabulary throughout the year. You can use these cards not only to introduce and reinforce new critical-thinking vocabulary but also, by selecting specific cards that are relevant to a given curriculum activity (e.g., sequencing in math, predicting in a science experiment, and inferring from a reading passage), you can use the cards to introduce those content area activites. With younger students, you can point out that: *"these are old and powerful 'friends' who in the past have helped us understand new ideas and solve difficult problems."* In the course of working through a reading comprehension lesson, for example, you can prompt your students to focus on the skill of inferring by saying: *"Select the particular friend/skill that has the power to help us now."*

With older students, you may want to use more sophisticated imagery by designing and referring to the flash cards as "business cards" or by turning them into a local business directory and asking your students to select the skills, or "services," they would hire to help

guide a particular inquiry or solve a given problem. You can use a publishing program, such as *Congratulations!* in Issue 26 of Microzine, to produce lively flash cards or supersized business cards.

Journals and Charts To emphasize the role of critical thinking (and writing) across the curriculum, ask your students to develop critical-thinking journals and charts or to write news articles that record/report on the different curriculum-specific situations in which they have used particular critical-thinking skills (e.g., inferring information from a short story, a social studies book, or a science experiment). They can publish a traditional journal or news article by using *NewsPrint* in Issue 22 of Microzine, or they can create an exciting electronic "slide show," complete with graphics, sound, and special effects, using *Presenting!* in Issue 31.

Activities for Teaching Critical-Thinking Roles

Role playing can provide one of the best pedagogical frameworks in which to help students understand and apply new skills. Research done by Bryce Hudgins and Sybil Edelman has shown that role playing in cooperative learning environments is a particularly successful strategy for developing critical-thinking abilities. They suggest using thinking roles similar to these: (1) Task Keeper, (2) Method Manager, (3) Progress Monitor, and (4) Reasoning Challenger.

Each role should be clearly defined in terms of the responsibilities it carries. For example, the job of the *Task Keeper* is to make sure that everyone understands and agrees on what the goal or problem is; the *Method Manager* is in charge of making sure that the group develops a practical method by which to pursue the inquiry; the *Progress Monitor* is responsible for tracking that progress is made and that all information is used effectively; and the *Reasoning Challenger* is the student who, at each step, must evaluate whether the team members' ideas and answers are logical and useful in achieving the goal or solving the problem.

If, for example, the Progress Monitor decides that progress has not been made, the Reasoning Challenger should question why he or she has concluded this. The Task Keeper may restate the task to help everyone focus on it. In turn, the Method Manager will be responsible for helping the group develop a new strategy if the group decides that one is needed.

Being assigned a specific role does not mean that a student cannot participate in all aspects of inquiry or problem solving. However, it does mean that he or she is the primary person responsible for the duties defined as part of that role. Activities that involve this type of role playing provide wonderful models for students because they reflect the process by which problems are best solved and decisions made in work environments and in the community. Furthermore, students learn to think and express themselves in logical ways in the course of having fun and working as a team.

It is important that your students don't get stuck or "type cast" in roles in which they are especially adept. Rather, they should rotate roles each time they work with their team. That way you ensure that everyone gains experience in the different thinking roles and that all students develop strength in the full range of critical-thinking skills. It also helps you build your class as a learning community in which each student's skills and talents can emerge.

Microzine *Twistaplots* and *Monitor Mysteries* and Microzine Jr. *Twistaplots* and *Micro Mysteries* provide the perfect environments for this kind of collaborative learning. Each adventure can be completed and the mystery solved by teams of students taking on the critical-thinking roles described on previous pages. Other roles can be developed as well. For example, when using *Twistaplots*, it is often useful to have a Map Maker. Or, you may want to create the roles of Detail Detector and Note Taker to be sure that careful records are kept of information that is found in *Twistaplot*s and *Monitor* or *Micro Mysteries*.

As students become more self-directed and adept at

decision making and problem solving, they can begin using these programs individually. The more experience students gain in taking on the different critical-thinking roles, the better able they are to internalize the roles and monitor themselves when they work independently. However, this does not mean that teamwork and formal role playing should be stopped once students internalize the roles. Group work and role playing provide outstanding opportunities for the refinement of oral language skills and team collaboration. These are important benefits that should continually be cultivated.

Management Strategies

Group Discussions You can conduct small group discussions on the roles as a means of training up to eight students at a time, while other students are engaged in independent work. Or, you can train four of your most able students who will then, as peer tutors, train the other students.

Scripts Create short scripts for each thinking role so that your students first can read the script themselves and then read it to their team. Each script should state what the role is, what the responsibilities are, and how the group can help. For example:

Progress Monitor says: *I am the Progress Monitor. As we use our group strategy to maneuver through the* Twistaplot, *I will keep track of our progress. To do this, I will make sure that we make the best use of the information we have. If we do not make progress, I will ask the Method Manager to help us reevaluate our strategy. I will need everyone's cooperation to keep track of all the information we find and to infer clues from it.*

Extension Activities

Thinking Caps If you are working with younger students using Microzine Jr., obtain enough sets of four different, inexpensive washable hats (e.g., baseball and stocking caps), so that each student can wear his or her own hat when working in critical-thinking groups.

(Instead of buying hats, students could make them out of construction paper. Also note that if you have created more than four roles, you will need the corresponding number of variations in hat colors or styles.)

Label each set of "thinking caps" with the role names, one per hat. Use the hats to introduce the roles and, when the students are working on a *Micro Mystery* or *Twistaplot*, have each one wear a hat that is appropriately labeled for his or her role. Later, when students rotate roles, they can change the labels on their hats to reflect their new roles. These hats also can be worn when your students work on critical-thinking tasks in the content areas.

Résumés If you are working with older students using Microzine, as your students take on different roles, each student can develop a critical-thinking résumé that lists job responsibilities, skills, and accomplishments. For example, one job description might be:

9/30/89 ***Reasoning Challenger, Constellation Odyssey***

Microzine, Issue 27

I was responsible for asking the members of my team why they thought their answers and ideas were correct. I used the skills of analyzing and evaluating to make sure their responses were logical. By doing this, I helped the group make correct choices in selecting the items to pick up and deliver to another location. We were successful in meeting our goal, which was to find the real constellations and return them to their proper place in the sky.

As students build their résumés, they can include content-area skills or specific curriculum situations in which they used critical-thinking skills (e.g., in writing a social studies research report, doing math homework, or creating a graph for science). The résumés can be as simple or as complex as your students want to make them. What is important is that the students have an opportunity to reinforce their awareness of the skills they are using and begin to see how these skills help define what they are capable of doing.

Students can make their résumés look more professional by using the publishing program *NewsPrint* in Issue 22 of Microzine. The printed résumés can be mounted on a bulletin board or used to fill jobs in the class. You can create "Want Ads" that describe the critical-thinking (and curriculum) skills that are required for the jobs. Interested students can apply by submitting their résumés. They also can use *Stationery Maker* in Issue 28 to create stationery on which to write a letter applying for the job. You may want to conduct "interviews" as part of an oral language lesson. As a reward and remuneration for doing the jobs, students can receive extra credit or additional opportunities to use Microzine programs. This provides students with a wonderful opportunity to begin understanding the real-world relationship between mastering skills and being qualified to do jobs.

GETTING THE MOST OUT OF MICROZINE

The previous chapter provided guidance in introducing students to the language and primary concepts of critical thinking. This chapter is devoted to helping you broaden student experience in critical thinking through the use of Microzine and Microzine Jr. It is divided into four sections. The sections reflect the four main types of programs in the series: *Twistaplot* Reading Adventures, *Math Ani-Malls* and *Math Malls*, Brainteasers, and Classroom and Desktop Publishing.

Each section opens with a general description of the type of program in that category (e.g., *Twistaplots*). For your convenience, this is followed by a list of all programs in Issues 1–5 of Microzine Jr. and Issues 22–31 of Microzine that fit into that category. (See pages 39–41 of the "Appendix" for information on Microzine Issues 1–21.) Next, there is a list of critical-thinking skills that can be applied and practiced when using the programs and then a list of content-area connections that can be made. This is followed by teaching tips on how to use the programs to motivate students and reinforce and extend their skills in critical thinking.

Twistaplot Reading Adventures

Program Description

Twistaplots are interactive reading adventures in which students select their own paths through branching stories. Throughout the reading process, students *make decisions* that affect the storyline. To complete the adventures successfully, students must *read for detail* and *comprehension*. While doing this, they exercise a wide variety of reading skills, engage in critical thinking, and learn about plot construction. Many of the stories include content-area reading in science and

social studies, and all stories are enhanced by lively graphics.

The highly motivational style of *Twistaplots* and the strong *contextual clues* often result in students reading above grade level. They learn *vocabulary* from context, rather than through memorization, and they become *involved in reading*, experiencing an immediate and valued reward for developing skill in comprehension.

List of Programs

Microzine Jr.

Safari!, Issue 1
Crickety Manor, Issue 2
The Great Frankfurter, Issue 3
ZooStorm, Issue 4
Your Town, Issue 5

Microzine

The Haunted Channels, Issue 22
Escape from ANTcatraz, Issue 23
Captains of the China Trade, Issue 24
Cosmic Heroes, Issue 25
The Wizard of Darkling Wood, Issue 26
Constellation Odyssey, Issue 27
Quest for the Pole, Issue 28
The Myths of Olympus, Issue 29
Toward the North Star, Issue 30
Volcanic Voyager, Issue 31

Critical-Thinking Skills

1. Observing
2. Sequencing
3. Organizing
4. Developing Problem-Solving Strategies
5. Predicting
6. Analyzing
7. Using Trial and Error
8. Recognizing Patterns
9. Judging Relevance of Information
10. Using Deductive Reasoning
11. Interpreting
12. Inferring
13. Evaluating
14. Drawing Conclusions
15. Decision Making
16. Identifying Part:Whole Relationships

Content-Area Connections

Primary Connections Reading for Pleasure and Content Reading in Science and Social Studies; Reading Skills—Vocabulary, Decoding, and Comprehension

Secondary Connections Writing/Note Taking, Mapping, and Following Directions

Teaching Tips

Motivation Activities *Twistaplots* are especially motivating programs. They are challenging and written to make students who work on them feel like heroes! To increase the motivational value of *Twistaplots*, you can form a Twistaplot Super Heroes Club for students who have successfully completed two or more adventures individually or as members of a team. Or, the requirements for entry into the club can be that students must have played each critical-thinking role at least once, successfully completing the adventures in which they had those roles.

To help you collect this information, and to further motivate students, you can create a class chart to track student progress as they build up their qualifications. Running down the chart, list each student's name. Running along the top of the chart, list each of the roles. As students succeed, the date on which they helped complete the adventure should be filled in next to their

name under the role they played. A certificate of club membership can be published using *Congratulations!* in Issue 26 of Microzine. The members of the Twistaplot Super Heroes Club can become peer tutors in reading and leading adventure teams.

Reinforcement and Extension Activities *Twistaplots* are rich with opportunities to build student vocabulary and skill in critical thinking. Listed below are suggestions on how to phrase questions to your students using the language of critical thinking. You can use these questions in teacher-directed lessons or small-group discussions, or you can create worksheets with them. To help your students get the most out of the *Twistaplot*, present the questions to them before they begin working on the adventure. That way, they can **reflect** on the questions as they work.

Making maps of the places through which students travel is essential to meeting the adventure goals in an efficient manner. Ask your students:

- *How did drawing a map help you **plan** and **make decisions** about how to move through the adventure?*

In many *Twistaplots*, students need to select items to pick up and put in their inventory. Ask your students:

- *What items did you pick up and put in your inventory? Tell what you **inferred** from the story that led you to think that each of the items was important to select.*

To complete the adventures, students must find and use information in a particular sequence. For example, in *Cosmic Heroes* in Issue 25 of Microzine, students must first *read for detail* in order to find the information about the planets. Then they must *analyze* the information to *infer* from it the planets to which they must travel. Say to your students:

- *Describe the **sequence** in which you found and used information to complete the adventure.*
- *When you **analyzed** information, how did you **evaluate** what information would be useful in **making decisions** or **solving a problem** and what would not?*
- *When you reached a "dead end" and had to move backwards in the story, did you find that you had overlooked important information or incorrectly **interpreted** information? Give examples and explain.*

Another way to reinforce students' awareness of the skills they use and their ability to articulate that awareness is through oral language activities such as creating "television" or "radio" interviews of Twistaplot Super Heroes. The same types of questions can be included as were stated above, as well as additional questions about other ways in which the Super Heroes use their critical-thinking skills (e.g., in the content areas). As with real TV and radio interviews, the program interviewer should, in advance, provide the interviewees with the questions that will be asked so that they can prepare their responses. As a lively backdrop for the show, students can use a publishing program such as *Banner Maker* in Issue 24 of Microzine or *Poster Maker* in Issue 30, to create a "Welcome Twistaplot Super Heroes" banner or poster.

Math Ani-Malls and Math Malls

Program Description

Microzine Jr. *Math Ani-Mall* and Microzine *Math Mall* programs provide highly motivating learning environments in which students can develop and practice their math and problem-solving skills. In each program, students work in an "out-of-this-world" shopping mall. The mall has ten busy stores filled with imaginative services and products, and customers—animals in *Math Ani-Mall* and aliens from outer space in *Math Mall*—who need assistance. It is the students' job to serve the customers. In each mall, doing so requires using specific mathematics skills. The skills range from performing computation with whole numbers to more complex tasks requiring skill in using percents. In all cases, students are given the opportunity to use a variety of

critical-thinking skills and to receive immediate feedback to keep them on track.

List of Programs

Math Ani-Malls
Issues 2 and 4

Math Malls
Issues 22, 23, and 26

Critical-Thinking Skills

1. Sequencing
2. Analyzing
3. Planning
4. Estimating
5. Using Trial and Error
6. Recognizing Patterns and Algorithms
7. Making Decisions
8. Developing Alternative Problem-Solving Strategies

Content-Area Connections

Math Skills Addition, Subtraction, Multiplication, Division, Fractions, Decimals, Percents, and Problem Solving

Teaching Tips

Motivation Activities The first activity is designed to motivate student interest and to weave the skills of mathematics and critical thinking into real-life contexts. Tell your students to imagine that they are in charge of setting up a shopping mall with six stores and that the mall will be located next to their school. (If your school is in an urban area, you can substitute a department store with six departments.)

Explain that each store should be a specialty shop (e.g., a sports-equipment store, a fruit store, a pet shop, etc.). As a class, determine the specialty of each of the six shops, keeping in mind that the customers will be students from the school. When the specialties have

been decided upon, divide the class into six groups, each of which will be in charge of a different store. (With younger students, it may be best to plan only one shop and to do it as an entire class rather than in small groups.)

Explain: *"Each group will be in charge of* ***planning*** *its store and, in the process, will need to* ***make decisions.*** *" Describe the planning sequence as follows: "(1) Decide what you will sell—up to four different items per store (e.g., in a fruit shop you could sell bananas, oranges, watermelons, and grapes); (2) Decide on a price for each item, and determine the unit of measurement for pricing (e.g., 'x' cents or dollars per ounce, per pound, or per item—such as $.50 per fruit); (3) Decide on how much of each item you will need to keep in stock every week."*

Say: *"You can use your critical-thinking skills to help you make reasonable decisions. For example,* (write the following list on the chalkboard):

"1. To help you decide what to sell, ***analyze*** *the general needs and interests of the students in our school to determine what they might want to buy.*

"2. To help you decide the price of each item, ***evaluate*** *the worth of the item based on how much students would be willing to pay for it and the cost of the item in local 'competing' stores.*

"3. To help you decide on how large an inventory to keep, ***estimate*** *how much you could sell in a week based on how many students are in the school and how much realistically they each might buy."*

You can assign the four critical-thinking roles to each group—one to each member. The group Task Keeper can focus students on the tasks of deciding what to sell, how much to sell it for, and how large an inventory to maintain. The group Method Manager can focus group members on the critical-thinking strategies which are, respectively, to *analyze* what students in the school want, to *evaluate* what they would be willing to pay, and to *estimate* how much of each item will be sold in a week.

The Progress Monitor and Reasoning Challenger, respectively, can track that progress is made and that student reasoning is logical.

Have the students work in groups for 10 to 15 minutes, and then have each group present their decisions and how they arrived at them through applying each of the three critical-thinking skills that they were asked to use (analyzing, evaluating, and estimating). For example, a student might say: "After *estimating* that half of the students in our school would buy one banana a week,... "

In concluding the lesson you can say: *"Planning a business requires the use of many critical-thinking and math skills. Running a business also requires these skills. When you use* Math Ani-Malls/Math Malls*, you will work in stores. You will have the opportunity to practice many skills including those you just used. You will need to analyze the problems to be solved in the shops, plan and evaluate your strategies for solving them, and estimate the solutions to problems for which you do not have an exact answer."*

Take the opportunity to help students see that like all critical-thinking skills, problem-solving skills are transferrable. You can describe them as being like tools in a tool box (their minds) that can be transported and used from one situation to another. Students can go on to use *Math Ani-Malls* or *Math Malls* in groups using the assigned critical-thinking roles, or they can work with partners or individually. You can conclude the activity with a discussion in which students **compare** and **contrast** how they used the skills of planning, analyzing, evaluating, and estimating to solve the problems of running the stores versus planning the stores.

For further motivation and experience in cross-curriculum writing, students can use a publishing program like *Poster Maker* in Issue 30 of Microzine to create a poster advertising for an assistant to help them in a *Math Ani-Mall* or *Math Mall*. Remind your students to list the responsibilities of the assistant as well as the math and critical-thinking skills an assistant would

need to fulfill those responsibilities.

Reinforcement and Extension Activities One of the most important outcomes of using *Math Ani-Malls* and *Math Malls* is student discovery of alternative problem-solving strategies. The concept that there can be a number of ways by which to arrive at a correct solution is primary to creative problem solving. To reinforce this concept, select a store from *Math Ani-Mall* or *Math Mall*—the example below is from the Barber Shop in Issue 2 of Microzine Jr. In this shop, students need to help their customers decide with which coins they will pay for their "hare cuts." On the chalkboard, reproduce the problem format:

Barber Shop

Hare Styles

$.37 Cost

___ *Total*

____ *Quarters*

____ *Dimes*

____ *Nickels*

____ *Pennies*

Tell your students: *"You are Problem-Solving Explorers, and I'd like you to discover all the routes to solving this problem. For example, you could use* **division** *to figure out how many nickels go into 37 cents and then decide with what coins you want to pay the remainder, or you could start by* **estimating** *how many dimes go into 37 cents."*

Discuss some of the other possible strategies, and then tell your students that they may choose a problem from one of the stores in the *Math Ani-Mall / Math Mall* that you have selected. Explain that their mission as Problem-Solving Explorers will be to discover and chart all the routes, or strategies, by which they can arrive at a correct solution for that problem. As explorers, tell them they need to keep a journal in which they record all the strategies/routes they discover.

If you teach the entire activity as a teacher-directed lesson, the class can work together to develop strategies and record them on the chalkboard. If your students work in groups, you can assign the critical-thinking roles to team members, as well as select one student who, as Note Taker, is responsible for recording each strategy.

After your student explorers complete the first phase of the "learning journey" in which they discover and record the routes, they will be ready for the second phase in which they chart their experiences on a "thinking map." Have the students create a free-form shape to represent the problem that was solved or territory explored. At one end of the shape, students can make a small circle and label it "Journey Starts Here." At the other end of the shape, they can make a star and label it "Solution City." Then, for every strategy they successfully used, students should draw a line from Journey Starts Here to Solution City. Suggest that your students vary the lines by making some routes more convoluted and others more direct—reflecting the differences in the strategies they used.

Have your students label each route sequentially—Route 1, Route 2, Route 3, etc. Then, in the legend below the map, have the students state the problem that was explored (e.g., finding the correct coins with which to pay for a "hare cut"), and using the notes in their journals and the corresponding route number on their map, students should describe each strategy they employed. You may also want your students to include the "dead end" routes they took, i.e., strategies that did not lead to successful solutions. This can be a wonderful opportunity to encourage your students to take risks in developing strategies. Let them know that real-life explorers are like all learners—they must be willing to make big mistakes in order to make even greater discoveries!

To extend the activity, students can create an electronic slide show about Problem-Solving Explorers on a learning journey, by using *Presenting!* in Issue 31 of Microzine. **Sequencing**, **mapping**, and **developing alternative problem-solving strategies** can be described as the survival skills of these mighty and fearless explorers. To enhance their presentations, students can use *Screen Artist* in Issue 29 to draw original backgrounds that can be "transported" to *Presenting!* (The "Select A Background" menu in *Presenting!* provides on-screen prompts on how to do this.)

These activities can provide graphic and powerful opportunities in which to help your students see the creative possibilities in problem solving. Furthermore, through the metaphor of explorers with a mission who must work their way through the phases of a journey, the activities reinforce the idea of learning as a *process*—and an exciting one at that!

Brainteasers

Program Description

There are two types of brainteasers in Microzine. The first type—*Micro Mysteries* in Microzine Jr. and *Monitor Mysteries* in Microzine—uses a mystery story format and emphasizes reading and reasoning skills. In these programs, students work as detectives, reading a story and using a "magnifying glass" to search a picture for further clues with which to solve the mystery. A series of questions is posed that the "detectives" answer based on the information and clues they have gathered. In turn, the computer indicates whether or not the student responses are correct. Students who solve either a *Micro* or *Monitor Mystery* on their first try are given an address to which they can write for an official *Micro* or *Monitor Mystery* Detective Diploma. The diploma states that the student has demonstrated all the skills that are necessary to become an official *Micro* or *Monitor Mystery* Detective.

The second type of brainteaser—*Eye Spy* in Microzine Jr. and *Picture This* in Microzine—is a computer version of "What's Wrong With This Picture?" These programs emphasize visual discrimination and reasoning skills. As with the mystery stories, students must work as

detectives. They examine a scene to determine which objects do not belong. When they select an item that does not belong (there are a total of 10 per scene), the inappropriate object is transformed into one that is appropriate for that scene. Many of the scenes call upon content knowledge in science and social studies. For example, in *A Day at the Beach* in Issue 1 of Microzine Jr., students must identify the objects that do not belong in the beach scene, and in *The Old West* in Issue 25 of Microzine, they must identify objects that are inappropriate to a western scene set in the 1800s.

The brainteasers provide students with challenging and enjoyable opportunities in which to practice critical thinking, especially their skill in *interpreting* and *analyzing* information and in using *inductive* and *deductive reasoning*. Because these programs are short, they can be used as 5- to 15-minute activities before or after longer lessons.

List of Programs

Micro Mystery

The Case of the Garden Plot, Issue 2
The Case of the Class Trip, Issue 5

Eye Spy

A Day at the Beach, Issue 1
The Mixed-up Kitchen, Issue 4

Monitor Mystery

Flimflam at the Flicks, Issue 22
The Case of the Foul Play, Issue 23
The Case of the Missing Wheel, Issue 24
Mystery on the High Seas, Issue 27
The Mystery of the Missing Mechanical Mutt, Issue 31

Picture This

The Wild West, Issue 25
Medical Mix-up, Issue 26

African Animals, Issue 28
Desert Dilemma, Issue 29

Critical-Thinking Skills

1. Observing
2. Organizing
3. Sequencing
4. Classifying
5. Comparing
6. Contrasting
7. Inferring
8. Analyzing
9. Synthesizing
10. Interpreting
11. Developing Problem-Solving Strategies
12. Using Inductive Reasoning
13. Evaluating
14. Drawing Conclusions
15. Making Decisions
16. Judging Relevance of Information
17. Identifying Part:Whole Relationships
18. Noting Inconsistencies
19. Recognizing Patterns

Content-Area Connections

Primary Connections Reading for Pleasure; Reading Skills—Vocabulary, Decoding, and Comprehension

Secondary Connections Writing/Note Taking, Social Studies, Science, and Visual Literacy

Teaching Tips

Motivation Activities As with the *Twistaplots*, the brainteaser programs are highly motivational. You can form a Daring Detectives Club for students who are successful in solving several brainteasers, or you can form a Super Solvers Club as a club for students who

successfully complete *Twistaplots* and solve brainteasers. In either case, you can print official certificates of membership with a publishing program such as *Congratulations!* in Issue 26 of Microzine and you can print club stationery with a program such as *Stationery Maker* in Issue 28.

Reinforcement and Extension Activities The following activities can be used to reinforce and extend students' critical-thinking, reading, writing, and oral language skills. They also provide opportunities for your students to share their accomplishments with students in other classes.

In teams or as a class, have your students write their own *Micro* or *Monitor Mystery* in the form of short stories or skits. Be sure to focus students' attention on clearly stating the mystery problem and leaving a trail of logical clues, and encourage your students to include interesting characters, lively dialogue, and humor.

If your students write stories, after you have approved the logic of each group's story and the logic of the clues, students can publish their stories in a news-article format using *NewsPrint* in Issue 22 of Microzine. Teams can exchange stories (or you can share them with other classes in your grade by creating a *Micro* or *Monitor Mystery Magazine* using *NewsPrint*), so that each team can try to solve the others' mysteries. This activity can take place over the course of a week or two, at the end of which students can make a grand finale presentation in which teams that have solved mysteries can present their solutions and the reasoning upon which their solutions are based.

If your students write skits, each team can perform their skit, after which the rest of the class can try to solve the mystery. (Classes that have written one skit as an entire class can perform the skit for another class.) The structure of the activity should be the same as was described above—you should approve the logic of the stories and clues before students present their skits, and students who solve the mysteries should present the logic behind their solutions. (For each presentation,

you can select a panel of Reasoning Challengers. The panel will be responsible for evaluating the presenter's logic.)

Whether student groups write stories or skits, you can assign the four standard critical-thinking roles to the team members to help structure the writing process. The Task Keeper can focus the group on developing a clear statement or theme for the mystery (the problem to be solved); the Method Manager can focus team members on developing a logical plot; and the Progress Monitor and Reasoning Challenger can, respectively, be in charge of tracking that the storyline is moving forward, rather than inordinately sidetracking, and that the clues lead to a logical solution.

Similar activities can be done based on *Eye Spy* or *Picture This*. Students can draw their own scenes and exchange them with classmates or other students in the school to solve. They can draw their scenes on paper, or they can create the scenes on the computer using a publishing program such as *Screen Artist* in Issue 29 of Microzine.

Whether creating or solving mystery stories or thematic pictures that include unrelated items, always encourage your students to use the vocabulary of critical thinking. For example, in justifying the value of a clue, a student "author" might say, "The reader will be able to *infer* from this clue that... ." In turn, a student detective might support his or her solution by stating, "I *inferred* from this clue that... ."

To give younger students more concrete experience with objects as you integrate critical thinking with content-area subjects, you can create a thematic, curriculum-based display on a table at the front of your classroom. Several objects in the display should be unrelated to the theme. The job of the students will be to identify the inappropriate objects and explain why they are inappropriate. For example, you could set up a science-based table with the theme of "Plants and Trees."

On the table, you might put several different kinds of

flowers, some petals, a cactus, the root of a plant, leaves from different kinds of trees, a piece of bark, a branch, an apple, a pine cone, and seeds. You can also display a sea shell, a whistle, a spoon, and a comb as the unrelated items. On the side, place a box with more plant- and tree-related items such as a pear, a plant leaf, a vine, and an acorn. When a student removes an unrelated item from the table display, he or she can select a replacement item from the box.

Before asking your students to identify the specific unrelated objects, be sure the class has identified the theme of the display and understands that the problem they must solve is to replace unrelated items with items that are related to the theme. This is important both as a **classifying** activity and in **identifying part-to-whole relationships**. To conclude the lesson, have students use **deductive reasoning** to justify why each item on the table belongs there. For example, a student referring to a daisy might say, "The daisy is a flower. All flowers are plants. Therefore, a daisy is a plant and is related to the theme of the display." After the activity, you can keep the items on exhibit in your room as part of a curriculum display, such as a science corner.

Classroom and Desktop Publishing

Program Description

Microzine Jr. and Microzine publishing programs provide students with the opportunity to communicate as publishers of newspapers, greeting cards, rebuses, games and puzzles, posters, banners, and even electronic "slide shows"—complete with words, graphics, sound, and special effects! The programs enable students to write book reviews, create graphs, maintain journals of science experiments, and write essays and articles on school events as well as on content-area subjects.

Students can collaborate, or work individually, on publishing projects. Either way they have ample opportunities to apply their skills in *planning, organizing,*

and *analyzing*, among other *critical-thinking* and *communications skills*. The excitement of the programs comes from the variety of attractive and polished work that can be created. These programs are perfect for use in Whole Language environments, as they engage students in the writing process and provide opportunities in which students can set their own goals and express personal perspectives and preferences.

List of Programs

Microzine Jr.

Mask Maker, Issue 1
Graph Maker, Issue 2
Going Dotty, Issue 3
Jigsaw Puzzler, Issue 4
Board Silly, Issue 5

Microzine

NewsPrint, Issue 22
Greetings!, Issue 23
Banner Maker, Issue 24
Blueprint Maker, Issue 25
Congratulations!, Issue 26
Rebus Maker, Issue 27
Stationery Maker, Issue 28
Screen Artist, Issue 29
Poster Maker, Issue 30
Presenting!, Issue 31

Critical-Thinking Skills

1. Observing
2. Planning
3. Organizing
4. Sequencing
5. Comparing
6. Analyzing

7. Synthesizing
8. Developing Problem-Solving Strategies
9. Using Trial and Error
10. Changing Variables
11. Identifying Part:Whole Relationships
12. Noting Inconsistencies
13. Identifying and Comparing Advantages and Disadvantages
14. Creative Thinking

Content-Area Connections

Primary Connections Whole Language, Language Arts, and Fine Arts

Secondary Connections All content areas in which written communication skills are developed, including science and social studies.

Teaching Tips

Motivation Activities Designing games and puzzles using publishing programs, such as *Going Dotty* and *Board Silly*, respectively, in Issues 3 and 5 of Microzine Jr. and *Rebus Maker* in Issue 25 of Microzine, provide highly motivational and creative opportunities in which students can apply their critical-thinking skills. In *Board Silly*, for example, students exercise skill in **planning, organizing, sequencing, analyzing,** and **identifying part-to-whole relationships** as they create the board layout, playing pieces, and game cards.

Whether your students work as a class, in groups, or individually, you can help them focus on their applications of critical-thinking skills by introducing the activity with a discussion of some of the skills they will be using. Discuss what the skills are, how students have used them before, and how they can be helpful now, in this new context. Try to elicit as much information from the students as possible. After they have designed their games, students can play them on the computer or print them out. The printed games also can be taken home and shared with friends and family.

Reinforcement and Extension Activities Throughout this guide there are many examples of how publishing programs can be used to reinforce and extend both critical-thinking and content-area skills. For example, on page 27 there is a description of how *Screen Artist* in Issue 29 of Microzine can be used in a mathematics lesson to extend skill in **sequencing**, **mapping**, and **developing alternative problem-solving strategies**; similarly, on page 30 there is a description of how to use *NewsPrint* in Issue 22 of Microzine to extend skills in **interpreting**, **analyzing**, **applying inductive** and **deductive reasoning**, and **creative writing.**

You and your students can explore the diverse applications of these and the other Microzine publishing programs. For example, your students can use *Presenting!* in Issue 31 to create dynamic, curriculum-based electronic slide shows. (They can make these presentations for the school science fair or a current events debate; they can enhance oral reports on health and safety with electronic slide shows on nutrition, exercise, and safety in the playground; and they can use *Presenting!* to create dramatic book reviews and advertisements to celebrate and publicize the literature and nonfiction they have read.)

These presentations can be enriched by electronically "transporting," or electronically "cutting and pasting," clip art from *Poster Maker* in Issue 30, to *Presenting!*, and by creating original backgrounds using *Screen Artist* in Issue 29 and then transporting them to *Presenting!* (To transport *Poster Maker* clip art for use with *Presenting!*, replace the *Presenting!* disk with the *Poster Maker* disk when the "Edit A Slide" menu is on-screen, and select "Clip Art." To access original art you have created with *Screen Artist* for use as a background with *Presenting!*, follow the prompts on the "Select A Background" menu in *Presenting!* Be sure to replace the *Presenting!* disk in your drive after you have finished transporting the art you need from either *Poster Maker* or *Screen Artist.*)

Each of the publishing programs provides a distinct learning opportunity in which your students can ex-

plore ideas and information and can apply their curriculum and critical-thinking skills. *Graph Maker* in Issue 2 of Microzine Jr. is a tool for creating bar graphs and pictographs of subjects across the curriculum. Your class can use the program to create a variety of graphs, including a bar graph showing the results of a student survey on musical preferences or a pictograph showing the number of moons of the different planets. *Poster Maker* can be used by your students to make posters or Big Books for the class, for students in a lower grade, or for the school or local library.

NewsPrint enables your students to create original, curriculum-based publications such as current-events newspapers, literary magazines, and science journals, each of which can be enhanced by electronically cutting and pasting art from programs such as *Greetings, Banner Maker,* and *Congratulations!*—respectively found in Microzine Issues 23, 24, and 26. (To transport the graphics from these programs, when the *NewsPrint* main menu is on-screen, replace the *NewsPrint* disk with the disk of the program you want to use, and then select "Article/Picture." Be sure to reinsert the *NewsPrint* disk when you have accessed all the graphics you want from the other disks.)

As is the case with all Microzine programs, the publishing programs can be used by individual students or in cooperative learning groups in which students are assigned the critical-thinking roles of Task Keeper, Method Manager, Progress Monitor, and Reasoning Challenger. Group discussion and problem solving should be focused on the application of critical-thinking skills. Students should always be encouraged to **reflect** on and discuss previous occasions in which they applied those skills. In doing so, they can **compare** and **contrast** their present situation with those in the past to help them consider which strategies and skills might work best now. Furthermore, students should be encouraged to use **trial and error** strategies. After implementing each strategy, they can **analyze** it—why it worked or didn't work and how it can be modified to be more effective.

APPENDIX

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Index to Microzine

All issues of Microzine Jr. and Microzine are listed in the Scholastic Software Catalog. To request a catalog, or to order the programs, contact your local Scholastic Representative or Scholastic Authorized Education Dealer, or write: Inquiry Department, Scholastic Inc., P.O. Box 7502, 2931 E. McCarty Street, Jefferson City, MO 65102. Order toll-free by calling 800-541-5513. In Missouri call 800-392-2179. The *Educator's Guide to Microzine and Microzine Jr.*, a curriculum index to all programs in the series, can be ordered by calling the toll-free numbers listed above.

Microzine Jr., Issues 1-5

Issue 1 MASK MAKER, a publishing program for creating masks; SAFARI!, a science-based *Twistaplot* reading adventure; TALK TO B.E.R.T., a game in which the computer models deductive reasoning; A DAY AT THE BEACH, an *Eye Spy* brainteaser.

Issue 2 GRAPH MAKER, a publishing program for creating bar graphs and pictographs; CRICKETY MANOR, a *Twistaplot* reading adventure; MATH ANI-MALL, a creative, math problem-solving program; THE CASE OF THE GARDEN PLOT, a *Micro Mystery* brainteaser.

Issue 3 GOING DOTTY, a puzzle publishing program; THE GREAT FRANKFURTER, a *Twistaplot* reading adventure; THE BALLOONATICS, an interactive story that can be printed; FUZZY TO FOCUSED, a series of 15 visual-discrimination puzzles.

Issue 4 JIGSAW PUZZLER, a puzzle publishing program; ZOOSTORM, a *Twistaplot* reading adventure; MATH ANI-MALL, a creative, math problem-solving program; THE MIXED-UP KITCHEN, an *Eye Spy* brainteaser.

Issue 5 BOARD SILLY, a publishing program for creating board games; YOUR TOWN, a social studies-based *Twistaplot* reading adventure; THE CASE OF THE CLASS TRIP, a *Micro Mystery* brainteaser; SOMETHING FISHY, an aquarium environment in which students can identify cause-and-effect relationships.

Microzine, Issues 1-31

Issue 1 HAUNTED HOUSE, a *Twistaplot* mystery adventure; SECRET FILES, a computerized notebook; POSTER, a full-color programming language; ASK ME, an interview with *E.T.* star Robert Macnaughton.

Issue 2 NORTHWOODS ADVENTURE, a *Twistaplot*; RIDE THE WIND, a simulated balloon race; MELODY MAKER, a music composition program; WORD LADDER, a vocabulary game.

Issue 3 MYSTERY AT PINECREST MANOR, a *Twistaplot*; AMAZING ROBOT, a programming language; BOOKSTORE, a data base; TAG, an action game.

Issue 4 ADVENTURES IN THE MICROZONE, a *Twistaplot*; LOG-IT!, a statistics tool; ASK ME: TOM SNYDER, an interactive interview with software designer Tom Snyder; TRAPS, an action game.

Issue 5 PIRATES OF THE SOFT SEAS, a *Twistaplot*; STORY TELLER, a powerful word/picture processor; AMAZING ROBOT II, a program language; FENCES, a strategy game.

Issue 6 FOSSILS ALIVE! a *Twistaplot*; OLYMPIC NEWS, a simulation of an electronic newspaper; FREE STORE, a data base of free (and almost free) mail-order items; SOUND OFF!, a collection of 40 sound effects.

Issue 7 BRAIN DRAIN, a *Twistaplot*; SURVEY TAKER, a tool for conducting surveys and analyzing data; CITY BLOCKS, a graphics program; BACK PAGE, a collection of special features.

Issue 8 ZAZOO COME HOME, a *Twistaplot;* SE-

CRET JOURNAL, a computerized diary; DRAWING BOARD, a high-resolution, high-interest graphics program; BACK PAGE, a collection of special features.

Issue 9 THE BIG NAP, a *Twistaplot*; BUDGET MAKER, a utility program for planning how to earn and/or spend money and for maintaining balance sheets; QUIZZLER, create-your-own quiz program on history, sports, and more; BACK PAGE, a collection of special features.

Issue 10 THE SHOT HEARD 'ROUND THE WORLD, a *Twistaplot*; SAILING, a simulation of a sailboat race; BILLBOARD, a chance to create an electronic billboard; BACK PAGE, a collection of special features.

Issue 11 THE DARK TOWER, a *Twistaplot*; SECRET CODER, a logic game that enables students to encode and decode messages and create an original cipher; STICKER FACTORY, a feature to design and print stickers; BACK PAGE, a collection of special features.

Issue 12 WAGONS WEST, an historical *Twistaplot*; NEWSPAPER MAKER, a program for writing, editing, and printing a newspaper; T-SHIRT PUZZLES, a strategy program that uses a robot to solve challenging logic puzzles; MICRO-TOON, an electronic comic strip.

Issue 13 THE FROG AND THE FABLES, a literature *Twistaplot*; WHO'S WHO IN OUTER SPACE, a data base with 150 real and imaginary space personalities; THE SECRET OF THE SPHINX, an adventure game in which questions can be answered by using a data base; BACK PAGE, a collection of special features.

Issue 14 THE FUNHOUSE CAPER, a deductive reasoning *Twistaplot*; INVENTORS & INVENTIONS, a data base using real and imaginary inventors and inventions; CARTOON MAKER, a program for creating and printing cartoon strips; PUZZLER, a program for designing and printing crossword puzzles.

Issue 15 2088: AN OVAL OFFICE ODYSSEY, an ethics/social studies *Twistaplot*; KEYBOARDING, a fun and challenging typing tutorial; ROUNDUP, a

math strategy game; ESTIMATOR, a math estimation program.

Issue 16 TICKETS TO AMERICA, a map skills/social studies *Twistaplot;* SOLAR PILOT, a weather simulation; A TRAVELER'S GUIDE TO FANTASTIC PLACES, a data base of 150 real and imaginary places; SHIFTY SHAPES, a series of electronic tangram puzzles.

Issue 17 MICROAGENT OF THE BODY GUARD, a science *Twistaplot*; MISSION: MIX-UP, a game of logic and deduction; MARVELOUS MENAGERIE, a data base of 150 real and imaginary animals; BASIC TRAINING, an introduction to BASIC programming.

Issue 18 HISTORY MYSTERY, a map skills/history *Twistaplot*; LETTER WRITER, a language arts program; SCHOLASTICALC, a program that enables students to create, edit, and print a spreadsheet; ROSE & CALUMNY, a series of spreadsheet puzzles.

Issue 19 MALICE IN WONDERLAND, a math skills *Twistaplot*; ANIMATION LAB, an animation program; CALENDAR, a language arts and history program; ESTIMATOR, a sequel to "Estimator" in Issue 15.

Issue 20 VOYAGE TO SEE WHAT'S ON THE BOTTOM, a language arts *Twistaplot*; HEROES & VILLAINS, a data base with 150 fictional heroes and villains; INTERACTIONS, a science-based game that requires students to balance ecosystems; MONITOR MYSTERY, a mystery that uses verbal and graphic clues.

Issue 21 ROBOT RESCUE, a sequel to "Brain Drain" *Twistaplot*; FABULOUS KIDS, a data base of 140 real and fictional children; FILL IN THE BLANKS, a computer version of Mad Libs; MONITOR MYSTERY, a critical-thinking program.

Issue 22 THE HAUNTED CHANNELS, a *Twistaplot* reading adventure; NEWSPRINT a publishing program for writing and illustrating stories, articles, and journals; MATH MALL, a creative, math problem-solving program; FLIMFLAM AT THE FLICKS, a *Monitor Mystery* brainteaser.

Issue 23 ESCAPE FROM ANTCATRAZ, a science-based *Twistaplot* reading adventure; GREETINGS!, a publishing program for creating greeting cards with text and graphics; MATH MALL, a creative, math problem-solving program; THE CASE OF THE FOUL PLAY, a *Monitor Mystery* brainteaser.

Issue 24 CAPTAINS OF THE CHINA TRADE, a social studies-based *Twistaplot* reading adventure; BANNER MAKER, a publishing program for creating banners with text and graphics; DR. MAXWELL'S MOLECULE MAGIC a science simulation; THE CASE OF THE MISSING WHEEL, a *Monitor Mystery* brainteaser.

Issue 25 COSMIC HEROES a science-based *Twistaplot* reading adventure; THE LEARNING MACHINE, a game in which the computer models deductive reasoning; BLUEPRINT MAKER, a publishing program for creating blueprints for toys and other objects; THE OLD WEST, a *Picture This* brainteaser.

Issue 26 THE WIZARD OF DARKLING WOOD, a *Twistaplot* reading adventure; MATH MALL, a creative, math problem-solving program; CONGRATULATIONS!, a publishing program for designing certificates with text and graphics; MEDICAL MIX-UP, a *Picture This* brainteaser.

Issue 27 REBUS MAKER, a publishing program for creating rebus puzzles; CONSTELLATION ODYSSEY, a science-based *Twistaplot* reading adventure; THE LEARNING MACHINE, a game in which the computer models deductive reasoning; MYSTERY ON THE HIGH SEAS, a *Monitor Mystery* brainteaser.

Issue 28 STATIONERY MAKER, a publishing program for designing and printing stationery; QUEST FOR THE POLE, a social studies-based *Twistaplot* reading adventure; SOUND LAB, a science simulation that explores sound; AFRICAN ANIMALS, a *Picture This* brainteaser.

Issue 29 SCREEN ARTIST, a publishing program for creating computer graphics that can be printed; THE

MYTHS OF OLYMPUS, a literature-based *Twistaplot* reading adventure; LIGHT ON TARGET, a science- and math-based game; DESERT DILEMMA, a *Picture This* brainteaser.

Issue 30 POSTER MAKER, a publishing program for making posters and Big Books; TOWARD THE NORTH STAR, a social studies-based *Twistaplot* reading adventure; CONTRAPTIONS, a problem-solving game; DOUBLE VISION, a series of 15 visual-discrimination puzzles.

Issue 31 PRESENTING!, a publishing program for creating electronic "slide shows"; VOLCANIC VOYAGER, a science-based *Twistaplot* reading adventure; GAME PLAN, a critical-thinking program for creating and playing on-screen board games; THE MYSTERY OF THE MISSING MECHANICAL MUTT, a *Monitor Mystery* brainteaser.

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